

## DrugFacts

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# Hallucinogens DrugFacts

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## What are hallucinogens?

Hallucinogens are a diverse group of drugs that alter a person's awareness of their surroundings as well as their own thoughts and feelings. They are commonly split into two categories: **classic hallucinogens** (such as LSD) and **dissociative drugs** (such as PCP). Both types of hallucinogens can cause *hallucinations*, or sensations and images that seem real though they are not. Additionally, dissociative drugs can cause users to feel out of control or disconnected from their body and environment.



Photo by © DEA

Blotter sheet of LSD-soaked paper squares that users take by mouth

Some hallucinogens are extracted from plants or mushrooms, and some are synthetic (human-made). Historically, people have used hallucinogens for religious or healing rituals. More recently, people report using these drugs for social or recreational purposes, including to have fun, deal with stress,

have spiritual experiences, or just to feel different.

Common classic hallucinogens include the following:

- **LSD (*D-lysergic acid diethylamide*)** is one of the most powerful mind-altering chemicals. It is a clear or white odorless material made from lysergic acid, which is found in a fungus that grows on rye and other grains.
- **Psilocybin (*4-phosphoryloxy-N,N-dimethyltryptamine*)** comes from certain types of mushrooms found in tropical and subtropical regions of South America, Mexico, and the United States.
- **Peyote (mescaline)** is a small, spineless cactus with mescaline as its main ingredient. Peyote can also be synthetic.
- **DMT (*N,N-dimethyltryptamine*)** is a powerful chemical found naturally in some Amazonian plants. Ayahuasca is a tea made from such plants, and when taken in this form it is also known as hoasca, aya, and yagé. People can also make DMT in a lab. Synthetic DMT usually takes the form of a white crystalline powder that is smoked.
- **251-NBOMe** is a synthetic hallucinogen with similarities both to LSD and MDMA (see DrugFacts: MDMA) but that is much more potent. Developed for use in brain research, when sold illegally it is sometimes called N Bomb or 251.



Photo by © Wikimedia Commons/[Salvia](#)

Salvia plant

Common examples of dissociative drugs include the following:



- **PCP (*Phencyclidine*)** was developed in the 1950s as a general anesthetic for surgery, but it is no longer used for this purpose due to serious side effects. PCP can be found in a variety of forms, including tablets or capsules; however, liquid and white crystal powder are the most common.

Photo by © Wikimedia Commons/[Ketamine](#)

Ketamine

- **Ketamine** is used as a surgery anesthetic for humans and animals. Much of the ketamine sold illegally come from veterinary offices. It mostly sells as a powder or as pills, but it also available as an injectable liquid. Ketamine is snorted or sometimes added to drinks as a date-rape drug.
- **Dextromethorphan (DXM)** is a cough suppressant and mucus-clearing ingredient in some over-the-counter cold and cough medicines (syrups, tablets, and gel capsules).
- **Salvia (*Salvia divinorum*)** is a plant common to southern Mexico and Central and South America. Salvia is typically ingested by chewing fresh leaves or by drinking their extracted juices. The dried leaves of salvia can also be smoked or vaporized and inhaled.

## How do people use hallucinogens?

People use hallucinogens in a wide variety of ways, as shown in the following chart:

Mode	DMT	LSD	Peyote	Psilocybin	DXM	Ketamine	PCP	Salvia
Swallowing as tablets or pills		X			X	X	X	
Swallowing as liquid		X	X		X	X		
Consuming raw or dried			X	X				X
Brewing into tea	X		X	X				X
Snorting						X	X	
Injecting							X	
Inhaling, vaporizing, or smoking	X						X	X
Absorbing through the lining of the mouth using drug-soaked paper pieces		X						

## How do hallucinogens affect the brain?

Research suggests that classic hallucinogens work at least partially by temporarily disrupting communication between brain chemical systems throughout the brain and spinal cord. Some hallucinogens interfere with the action of the brain chemical serotonin, which regulates:

- mood
- sensory perception
- sleep
- hunger
- body temperature
- sexual behavior
- intestinal muscle control

Dissociative hallucinogenic drugs interfere with the action of the brain chemical glutamate, which regulates:

- pain perception
- responses to the environment
- emotion
- learning and memory

## What are some other effects of hallucinogens?

### Classic Hallucinogens

#### Short-Term Effects

Classic hallucinogens can cause users to see images, hear sounds, and feel sensations that seem real but do not exist. The effects generally begin within 20 to 90 minutes and can last as long as 12 hours in some cases (LSD) or as short as 15 minutes in others (synthetic DMT). Hallucinogen users refer to the experiences brought on by these drugs as "trips." If the experience is unpleasant, users sometimes call it a "bad trip."

Along with hallucinations, other short-term general effects include:

- increased heart rate
- nausea
- intensified feelings and sensory experiences (such as seeing brighter colors)
- changes in sense of time (for example, the feeling that time is passing by slowly)

Specific short-term effects of some hallucinogens include:

- increased blood pressure, breathing rate, or body temperature
- loss of appetite
- dry mouth
- sleep problems

- spiritual experiences
- feelings of relaxation
- uncoordinated movements
- excessive sweating
- panic
- *paranoia*—extreme and unreasonable distrust of others
- *psychosis*—disordered thinking detached from reality
- bizarre behaviors

## Long-Term Effects

Two long-term effects have been associated with use of classic hallucinogens, although these effects are rare.

- ***Persistent Psychosis***—a series of continuing mental problems, including:
  - visual disturbances
  - disorganized thinking
  - paranoia
  - mood changes
- ***Hallucinogen Persisting Perception Disorder (HPPD)***  
—recurrences of certain drug experiences, such as hallucinations or other visual disturbances. These flashbacks often happen without warning and may occur within a few days or more than a year after drug use. These symptoms are sometimes mistaken for other disorders, such as stroke or a brain tumor.



Photo by © flickr.com/[Steve Johnson](https://www.flickr.com/photos/stevejohnson/)

Hallucinogens can cause severe visual disturbances.

Both conditions are seen more often in people who have a history of mental illness, but they can happen to anyone, even after using hallucinogens one time. For HPDD, some antidepressant and antipsychotic medications can be used to improve mood and treat psychosis. Behavioral therapies can be used to help people cope with fear or confusion associated with visual disturbances.

## Dissociative Drugs

### Short-Term Effects

Dissociative drug effects can appear within a few minutes and can last several hours in some cases; some users report experiencing drug effects for days.

Effects depend on how much is used. In low and moderate doses, dissociative drugs can cause:

- numbness
- disorientation and loss of coordination
- hallucinations
- increase in blood pressure, heart rate, and body temperature

In high doses, dissociative drugs can cause the following effects:

- memory loss
- panic and anxiety
- seizures
- psychotic symptoms
- amnesia
- inability to move
- mood swings
- trouble breathing

### Effects on a Developing Fetus

While the effects of most hallucinogens on the developing fetus are unknown, researchers do know that mescaline in peyote may affect the fetus of a pregnant woman using the drug.



## Long-Term Effects of Dissociative Drugs

More research is needed on the long-term effects of dissociative drugs. Researchers do know repeated use of PCP can result in addiction. Other long-term effects may continue for a year or more after use stops, including:

- speech problems
- memory loss
- weight loss
- anxiety
- depression and suicidal thoughts

## Can a person overdose on hallucinogens?

It depends on the drug. An overdose occurs when a person uses enough of a drug to produce serious adverse effects, life-threatening symptoms, or death. Most classic hallucinogens may produce extremely unpleasant experiences at high doses, although the effects are not necessarily life-threatening. However, serious medical emergencies and several fatalities have been reported from 251-NBOMe.

Overdose is more likely with some dissociative drugs. High doses of PCP can cause seizures, coma, and death. Additionally, taking PCP with depressants such as alcohol or benzodiazepines can also lead to coma. Benzodiazepines, such as alprazolam (Xanax), are prescribed to relieve anxiety or promote sleep.

However, users of both classic hallucinogens and dissociative drugs also risk serious harm because of the profound alteration of perception and mood these drugs can cause.

- Users might do things they would never do in real life, like jump out of a window or off a roof, for instance, or they may experience profound suicidal feelings and act on them.
- With all drugs there is also a risk of accidental poisoning from contaminants or other substances mixed with the drug.



- Users of psilocybin also run the risk of accidentally consuming poisonous mushrooms that look like psilocybin. Taking poisonous mushrooms can result in severe illness or possible death.

## Are hallucinogens addictive?

In some cases, yes. Evidence suggests that certain hallucinogens can be addictive, and that people can develop a tolerance to them.

For example, LSD is not considered an addictive drug because it doesn't cause uncontrollable drug-seeking behavior. However, LSD does produce tolerance, so some users who take the drug repeatedly must take higher doses to achieve the same effect. This is an extremely dangerous practice, given the unpredictability of the drug. In addition, LSD produces tolerance to other hallucinogens, including psilocybin.

The misuse and addiction potential of DMT is currently unknown. Unlike other hallucinogens, DMT does not appear to lead to tolerance. There is also little evidence that taking it in the form of ayahuasca tea can lead to addiction.

On the other hand, PCP is a hallucinogen that can be addictive. People who stop repeated use of PCP experience drug cravings, headaches, and sweating as common withdrawal symptoms.

More research is needed on the tolerance or addiction potential of a variety of hallucinogens.

### Tolerance vs. Dependence vs. Addiction

Long-term use of prescription opioids, even as prescribed by a doctor, can cause some people to develop a **tolerance**, which means that they need higher and/or more frequent doses of the drug to get

## How is a hallucinogen addiction treated?

There are no FDA-approved medications to treat addiction to hallucinogens. While behavioral treatments can be helpful for patients with a variety of addictions, scientists need more research to find out if behavioral therapies are effective for addiction to hallucinogens.

## Could hallucinogens be medicines?

Potentially. Some hallucinogens are being studied for possible therapeutic benefits in treating mental disorders such as depression.

Ketamine was approved many years ago as an anesthetic for painful medical procedures. In March 2019, the medicine esketamine (called “Spravato” by the manufacturer) was approved by the Food and Drug Administration as a treatment for severe depression in patients that do not respond to other treatments. Esketamine is closely related to the drug ketamine which is used illicitly and so there are concerns about the potential for misuse of this newly approved medication. In response, esketamine will be limited to administration in medical facilities.

Unlike a prescription that can be taken home and might be diverted into recreational use, esketamine will be administered in a medical office as a nasal spray. Patients must wait at least 2 hours under medical supervision to ensure proper management of potential side effects. It is a rapid acting medication, so improvements may be seen immediately or within the first few weeks of treatment (unlike most other antidepressants which can take weeks to begin to show an effect). Traditional antidepressants target the neurotransmitters serotonin,

the desired effects.

**Drug dependence** occurs with repeated use, causing the neurons to adapt so they only function normally in the presence of the drug. The absence of the drug causes several physiological reactions, ranging from mild in the case of caffeine, to potentially life-threatening, such as with heroin. Some chronic pain patients are dependent on opioids and require medical support to stop taking the drug.

**Drug addiction** is a chronic disease characterized by compulsive, or uncontrollable, drug seeking and use despite harmful consequences and long-lasting changes in the brain. The changes can result in harmful behaviors by those who misuse drugs, whether prescription or illicit drugs.

norepinephrine or dopamine. Esketamine affects the receptor for a different brain chemical called glutamate and so it represents a new approach to treating depression.

There is also some evidence that psilocybin may be effective in treating depression and anxiety.<sup>1</sup> The FDA has granted “Breakthrough Therapy” designation for two formulations of psilocybin being studied for safety and efficacy as a medical treatment for depression. It’s important to note that during such studies, psilocybin is always taken under medical supervision.

## Points to Remember

- Hallucinogens are a diverse group of drugs that alter perception, thoughts, and feelings. They cause hallucinations, or sensations and images that seem real, but they are not.
- Hallucinogens are split into two categories: classic hallucinogens and dissociative drugs.
- People use hallucinogens in a wide variety of ways, including smoking, snorting, and absorbing through the lining in the mouth.
- The effects of classic hallucinogens can begin with 20 to 90 minutes of taking them and include increased heart rate, nausea, intensified feelings and sensory experiences, and changes in sense of time.
- The effects of dissociative drugs can begin within minutes and can last several hours and include numbness, disorientation and loss of coordination, hallucinations, and increased blood pressure, heart rate, and body temperature.
- *Persistent psychosis* and flashbacks are two long-term effects associated with some hallucinogens.
- Evidence suggests a few hallucinogens can be addictive, and some of them can produce tolerance.
- There are no FDA-approved medications to treat addiction to hallucinogens. Scientists need more research to find out if behavioral therapies are effective for addiction to hallucinogens.
- Some hallucinogens are being studied as possible therapies for depression. Esketamine was recently approved by the FDA as a treatment for severe depression in patients that do not respond to other treatments.

## Learn More

For more information about hallucinogens, please visit:

- [Hallucinogens and Dissociative Drugs Research Report](#)
- [Commonly Used Drugs Chart](#)

## Reference

1. Goldberg SB, Pace BT, Nicholas CR, Raison CL, Hutson PR. The experimental effects of psilocybin on symptoms of anxiety and depression: A meta-analysis. *Psychiatry Research*. 2020;284:112749. doi:10.1016/j.psychres.2020.112749

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